

BASIS FOR THE AMENDMENT

Claims 1-2, 4-13 and 19-31 are active in the present application. Claims 1-13 and 19-22 are currently under active prosecution. Claim 3 has been canceled. Claim 1 has been amended for clarity and to include the limitations of previous Claim 3. Claims 23-26 are non-elected claims withdrawn from consideration. Claim 29-31 are new claims. Support for new Claim 29-31 is found in the original claims. The claims have been amended for clarity. No new matter is believed to have been added.

REQUEST FOR RECONSIDERATION

Applicants thank Examiner Price for the helpful and courteous discussion of November 7, 2003. During the discussion, Applicants' U.S. representative pointed out that a heterogeneous process that produces dimerized C₆ olefins to yield the branched dimerization products recited in the present independent claim is not disclosed in the prior art references relied upon by the Office.

The Office rejected Claims 1-4, 13 and 22 under 35 U.S.C. § 103(a) in view of patents to Threlkel (U.S. 4,959,491) and Singleton (U.S. 5,780,694). Applicants traverse the rejection on the grounds that the prior art references do not require that the dimerization is carried out heterogeneously.

Present amended independent Claim 1 requires that the dimerization is carried out with heterogeneous catalysis. Heterogeneous catalysis offers advantages such as (1) ease of removal of catalyst (e.g., separation of the catalyst from the finished product), (2) economic benefits, (3) environmental benefits (page 6, lines 29-34), and (4) absence of halogen impurities (page 7, lines 1-6).

Threlkel discloses dimerizations that are carried out under homogeneous conditions (see Abstract). Threlkel further discloses that heterogeneous catalysts have disadvantages and are not desirable:

The prior art systems using heterogeneous catalyst suffer from the usual contact problems incident to such catalysts. Moreover, the heterogeneous catalysts used by the prior art are frequently difficult and expensive to prepare (column 2, lines 59-63).

Threlkel discloses at column 7, lines 7-8 “[t]ypically, the polymerization is conducted as a liquid phase reaction . . .” The prior art catalysts disclosed for the dimerization of the starting olefin (e.g., a C₃ olefin) to form a C₆ olefin may also be used in the dimerization. For example, it is stated at column 7, lines 30-31: “[a] homogeneous catalyst is also used in the

second step dimerization”. Although a number of catalyst species are disclosed (for example, column 7, lines 37-52), Applicants submit that those of ordinary skill in the art would readily recognize that these catalysts are commonly used as homogeneous catalysts and not heterogeneous catalysts. Homogeneous catalysts are described in the Examples (see for example, column 10, line 58; column 11, lines 7-8; column 11, line 23).

Likewise, Singleton discloses that the dimerization is preferably conducted under homogeneous conditions. For example, it is disclosed:

The dimerization is generally conducted as a liquid phase reaction (column 7, lines 51-52).

A preferred class of catalysts used in the process are homogeneous catalysts (column 8, lines 23-24).

Threlkel discloses that in one aspect of the prior art invention, mixtures of multi-branched products (see present dependent Claim 13 – see further discussion below) can be obtained (column 3, line 35-40); however the “selection of the catalyst for the dimerization is particularly important” and homogeneous conditions are referenced (see disclosure at column 4, lines 47-48 which refers back to column 4, lines 7-9).

Singleton discloses a number of homogeneous catalysts beginning at column 8, line 28 through column 9, line 35. Applicants submit that those of ordinary skill in the art would readily recognize that these catalyst materials are used in homogeneous catalyst systems.

Singleton, in fact, nowhere mentions heterogeneous catalysts.

Applicants submit that a process carried out under heterogeneous catalytic conditions is not obvious in view of the prior art’s express preference towards homogeneous catalysts and the express teaching that heterogeneous catalysts suffer from disadvantages. Applicants therefore submit that amended Claim 1 is novel and not obvious in view of the prior art cited by the Office.

Applicants therefore respectfully request the withdrawal of the rejection.

Applicants submit that the presently claimed invention is further patentable as reflected in the present dependent claims which limit one or more characteristics of the product of the claimed process.

For Example, the surfactant alcohol of dependent Claim 13 and the alkoxylation product of new dependent Claim 30 require that the degree of branching is between 2.0 and 3.0.^{1,2} Threlkel discloses that the amount of multi-branched C₁₂ olefins present in the prior art composition is from 10-40% by weight. Applicants submit that an olefin mixture with a degree of branching greater than 2.0 is not necessarily obvious in view of the compositions of Threlkel which, although they may contain multi-branched components, contain such multi-branched dimerization products in amounts that do not inherently provide the degree of branching as claimed in present dependent Claim 13.

On the other hand, dependent Claim 21 requires that the olefin mixture contain less than 10% unbranched olefins. How can the olefin mixtures of Threlkel which are disclosed to contain 60% by weight of linear and mono-branched olefins inherently include olefin mixtures having less than 10% of unbranched (i.e., linear) olefins?

Applicants submit that the rejection of Claim 21 as anticipated by Threlkel under 35 U.S.C. §102(b) is not supportable and should be withdrawn (especially in view of the fact that the C₆ hexene of Example 1 includes a branched component in an amount of more than 10% by weight – see Table 1; 2-methylpent-2-ene = 13.5%).

Applicants respectfully request the withdrawal of the rejections under 35 U.S.C. § 102(b) of present dependent Claim 21 in view of Threlkel.

¹ A degree of branching of 2.1 (e.g., the iso index) corresponds to 4.1 methyl groups in the molecule which indicates two branches (e.g., two terminal methyl groups and two methyl groups from branching units) – see Example 1; page 17, line 18.

² Singleton discloses that the prior art dimerized products have an average number of branches of from 0.9 to 2.0 (see Abstract).

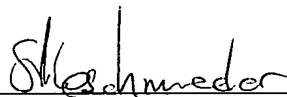
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Reply to Office Action of August 12, 2003

Applicants submit concurrently herewith an Information Disclosure Statement providing references which describe the reaction mechanisms of, for example, heterogeneously catalyzed reactions. Applicants request acknowledgement that the references have been considered in the examination of the above-identified application by return of a signed, dated and initialed copy of the PTO-1449.

Applicants submit the amendment to the claims places all now-pending claims in condition for allowance. Applicants respectfully request the withdrawal of the rejections and the passage of all now-pending claims to Issue.

Respectfully submitted,

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